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**NAVAL WAR COLLEGE  
Newport, R.I.**

**Back to the Basics:  
Recapturing Command and Control  
of Contingency Installation Engineering**

**by**

**Patrick G. Miller**

**Major, USAF**

**A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.**

**The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.**

**Signature: //SIGNED – pgm, 4 May 11//**

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## **Abstract**

### *Back to the Basics: Recapturing Command and Control of Contingency Installation*

*Engineering.* In meeting the objectives of the 2011 National Military Strategy, perhaps the strongest statement the United States can make is committing its military forces to action on foreign soil. A vital component for joint force commanders to consider when basing forces in a contingency environment is the ability to project power and sustain forces across the respective theater via contingency base camps. The required capabilities to establish and operate a base camp, referred to as contingency installation engineering, are recognized by the Department of Defense as critical to the success of military operations; command and control of the contingency installation engineering mission is the focus of this paper.

Command and control of contingency installation engineering across the range of military operations is inefficiently executed resulting in degraded mission effectiveness and wasted resources. This paper defines contingency installation engineering. Then the paper discusses operational command and control challenges with respect to unity of command and unity of effort. Finally, the paper provides recommendations in order to maximize engineer forces' efficiency.

## INTRODUCTION

One of the basic premises of *The National Military Strategy (NMS) of the United States of America - 2011* is for the Joint Force to prepare for an increasingly dynamic and uncertain future in which the United States requires a full spectrum of military capabilities across a diverse contingency environment.<sup>1</sup> In meeting the objectives of the NMS, perhaps the strongest statement the United States can make is committing its military forces to action on foreign soil. Regardless of geographic theater, a vital component for joint force commanders (JFC) to consider when basing forces in a contingency environment is the ability to project power and sustain forces across the theater via contingency base camps. Referred to as contingency installation engineering, the Department of Defense (DOD) recognizes the required capabilities to establish and operate a base camp as critical to the success of military operations; command and control (C2) of the contingency installation engineering mission is the focus of this paper.

C2 of contingency installation engineering across the spectrum of military operations is inefficiently executed resulting in degraded mission effectiveness and wasted resources. First, contingency installation engineering C2 violates unity of command impacting the efficient use of limited resources. Second, contingency installation engineering C2 contravenes unity of effort resulting in haphazard operations. If the JFC does not reconcile C2 of contingency installation engineering, then Joint Engineers will continue to execute inefficiently the contingency installation engineering mission.

In order to explore fully the operational challenges highlighted above, this research paper first defines contingency installation engineering. After establishing a common lexicon, the paper discusses contingency installation engineering operational challenges with

respect to unity of command and unity of effort. Then the paper addresses potential Service concerns regarding changes to the current employment of engineer forces. Finally, the paper provides recommendations in order to maximize engineer force efficiency. Examples from two recent major operations - Operation IRAQI FREEDOM (OIF) and Operation ENDURING FREEDOM (OEF) – illustrate the effects of inefficient contingency installation C2 and highlight areas for improvement. Although the paper uses examples from United States Central Command (USCENTCOM), the lessons learned are universal to all theaters.

### **CONTINGENCY INSTALLATION ENGINEERING DEFINED**

Contingency installation engineering, as defined by this author, is the planning, programming, design, construction, and operation and maintenance of facilities and infrastructure necessary to sustain a base camp in support of contingency operations. Base camps range from small firebases servicing less than a platoon to large forward operating bases sustaining tens of thousands of joint and multinational forces. Forces require base camps during contingencies to serve as both a power projection platform and source of sustainment.

Contingency installation engineering is the primary role of general engineering, one of three engineer functions outlined in Joint Publication 3-34, *Joint Engineer Operations*. Specifically, general engineering “modifies, maintains, and protects the physical environment, including infrastructure, facilities, lines of communication and bases, protection of natural and cultural resources, terrain modification and repair, and selected explosive hazard activities”<sup>2</sup>

Engineer forces from all the Services execute the contingency installation engineering mission across the range of military operations, in diverse contingency environments, and

throughout the various phases of operations. During major operations and campaigns, the contingency installation engineer role grows as the operation progresses through each phase. During Phase 0 (Shape), engineers prepare overseas bases for force deployment and begin planning advanced bases. In Phase I (Deter), engineers establish advance bases to receive and employ forces. During Phase II (Seize Initiative), engineers continue developing bases providing facilities and infrastructure to support the assigned missions. Finally, throughout Phase III (Dominate), Phase IV (Stabilize), and Phase V (Enable Civil Authority), engineers sustain the force and support base defense, force protection, and battle damage repair.<sup>3</sup>

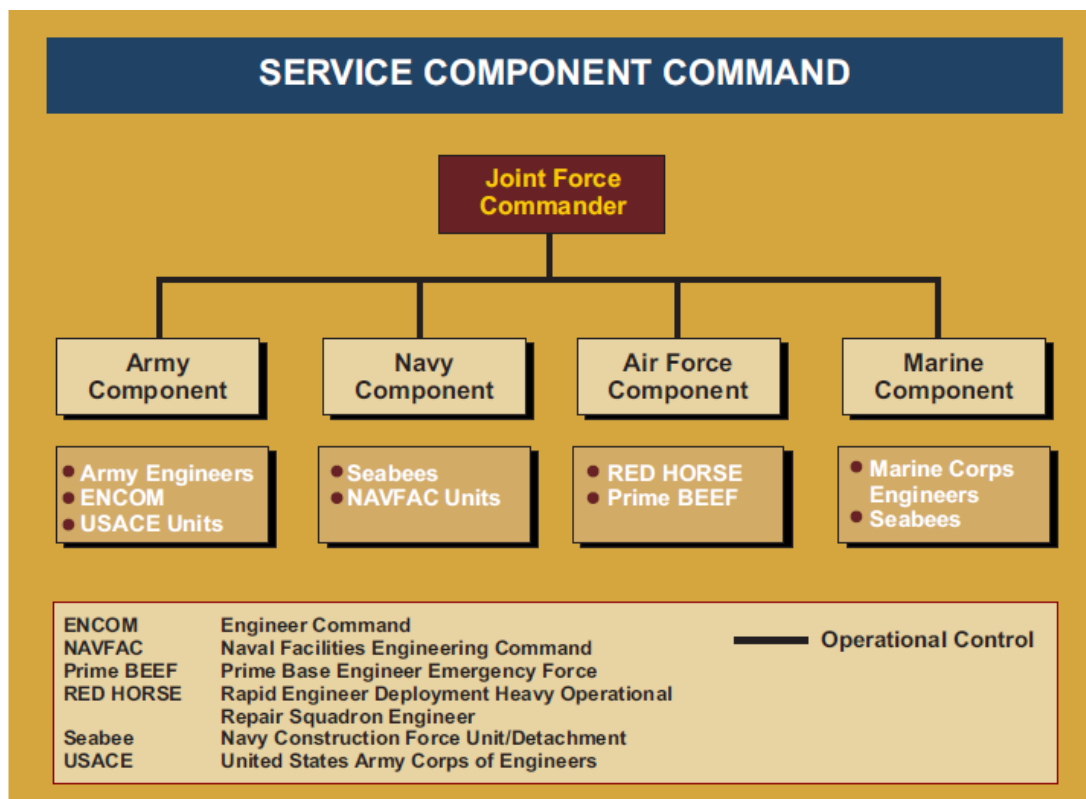
### **UNITY OF COMMAND**

With a common understanding of contingency installation engineering and its role in supporting the JFC's mission established, the discussion can move to contingency installation engineering C2 concerns. The first challenge to discuss is unity of command. Joint Publication 1, *Doctrine for the Armed Forces of the United States*, defines unity of command as "all forces operating under a single commander with the requisite authority to direct all forces employed in pursuit of a common purpose."<sup>4</sup>

The operational level is where synchronization of theater requirements occurs. Unity of command is essential for proper employment of joint engineer forces. A lack of unity of command results in inefficient employment of joint engineer resources across the areas of operation and impacts the ability to support the JFC's mission.<sup>5</sup> The two primary areas of concern regarding unity of command involve the higher headquarters staff construct and the division of installation engineering responsibilities.

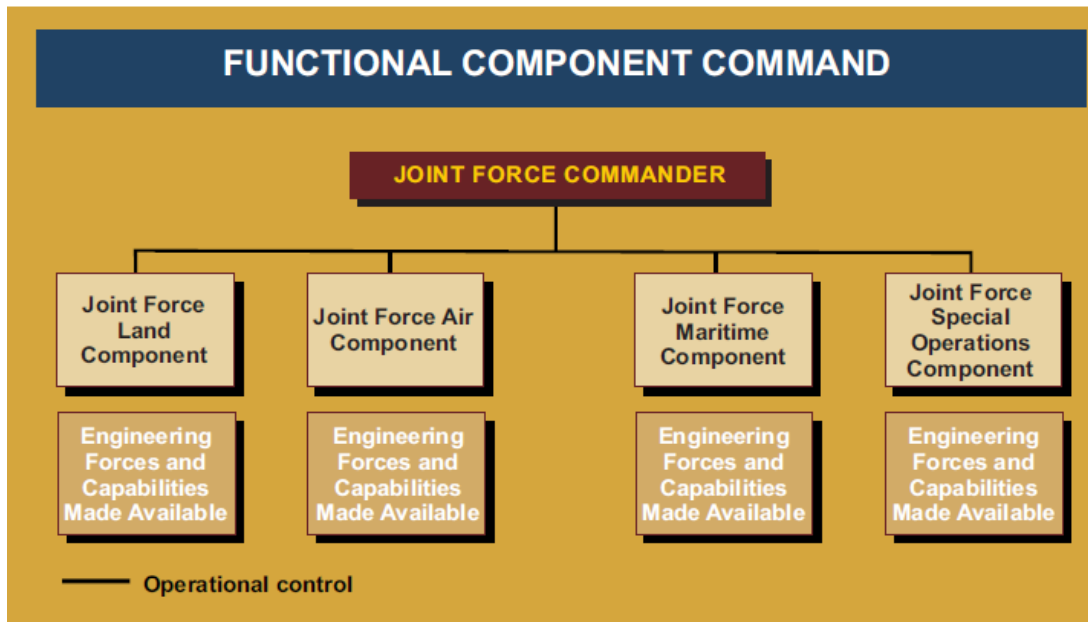
Higher headquarters staffs must understand and have the authority to integrate engineer capabilities across the range of operations within a theater to ensure proper support

of the JFC's mission. To aid in the establishment of a joint staff, Joint Publication (JP) 3-34, *Joint Engineer Operations*, outlines various C2 relationships.<sup>6</sup> If the engineer mission is minor, the staff may fall under the logistics directorate. However, if the engineering effort is significant, then the JFC may consider a separate engineer staff. During both OEF and OIF, the theater geometry, vast battle-space, and wide array of objectives and engineer mission sets caused the theater engineering effort to be a key element of the joint mission. To oversee the mission, the JFC established a separate engineer staff. JFCs can organize separate engineer staffs by Service component commands (Figure 1) or functional component commands (Figure 2) depending on the mission.



**Figure 1.** Service Component Command<sup>7</sup>





**Figure 2.** Functional Component Command (JP 3-34, 2007)<sup>8</sup>

In most cases, the JFC utilizes a combination of Service component and functional component commands for flexibility. The proposed C2 relationships maximize key C2 tenets – clearly defined authorities, roles, and relationships; information management; communication; coordination mechanisms; situational awareness; and mutual trust.<sup>9</sup>

Maintaining unity of command at the operational level provides the JFC and staffs a common operating picture of engineer forces across the theater, ensures synchronized engineer efforts focused on theater priorities, and retains control of engineer force assignment. OEF and OIF higher headquarters staffs failed to follow the principle of unity of command for engineer activities, specifically regarding the C2 tenets of clearly defined authorities, roles, and relationships and situational awareness.

During both OEF and OIF, engineer forces were not aligned under a single commander. Instead, the theaters were sub-divided into regions (e.g., Regional Command – South), as well as divided across multiple staffs (e.g., Multi-National Corps – Iraq, International Security Assistance Force, or United States Forces Afghanistan) eliminating

centralized mission command of engineer assets theater-wide. Additionally, the engineer forces were task organized (e.g., stability operations, combat engineering, or installation engineering) eliminating flexibility to reassign forces across missions. The OEF and OIF higher headquarter staffs elected to establish this C2 structure to manage a large battle space with wide-ranging missions in various stages. However, the disjointed construct prevented a common theater engineer operating picture.

Highlighting the magnitude of poor engineer force unity of command, the Commission on Wartime Contracting in Iraq and Afghanistan discovered that in less than a year's time, the Army and the Air Force approved thousands of new minor-construction projects worth approximately \$1 billion in total with no single senior official monitoring growing expenditures, strategically managing requirements, or implementing quality assurance.<sup>10</sup> Furthermore, a 2010 Engineer Collection Analysis Team discovered the task organization eliminated the ability of the theater command to reorganize engineer assets.<sup>11</sup> A common operational picture of all engineer organizations, their assets, and resources available did not exist at the theater level.

In an attempt to align engineer forces under a single command during OEF, United States Forces Afghanistan (USFOR-A) established the Joint Force Engineer Command (JFEC). The concept proved successful but short-lived. When the International Security Assistance Force (ISAF) stood up International Joint Command (IJC), the IJC significantly altered the C2 relationships. Although the IJC did not task any single command entity with maintaining oversight and synchronizing the engineer missions across the theater, USFOR-A dissolved the JFEC once again fracturing unity of command.

The second area of concern with respect to unity of command involves the division of contingency installation engineering responsibilities, specifically with respect to Base Operating Support-Integrator (BOS-I) and Senior Airfield Authority (SAA). USCENTCOM established BOS-I and SAA to improve management and planning of base camps. BOS-I coordinates contracting support and the efficient use of mission support resources for sustainment of encamped forces.<sup>12</sup> In other words, BOS-I owns and operates the base camp. SAA controls, operates, and maintains the airfield, as well as the land and facilities whose proximity affects airfield operations.<sup>13</sup> The SAA realm is usually located within the base camp. Typically, a JFC assigns BOS-I responsibilities to the Service owning the preponderance of forces at the base camp and SAA to the Service owning the preponderance of air assets. Ideally, the JFC assigns BOS-I and SAA responsibilities to a single Service.

By establishing separate BOS-I and SAA roles and responsibilities, USCENTCOM introduced a potential fissure to the principle of unity of command with respect to installation engineering forces. The governing regulation, United States Central Command Regulation 415-1, *"The Sand Book"*, violates the C2 tenet of clearly defined authorities, roles, and relationships by vaguely defining BOS-I and SAA roles and responsibilities. When a JFC assigns BOS-I and SAA responsibilities to different Services at a single installation, no single commander is responsible for total engineer support. The airfield essentially becomes a small base camp within a larger base camp. To support BOS-I and SAA missions, engineer assets are functionally assigned to each provider. BOS-I engineers service the base; SAA engineers service the airfield and related facilities. The first time these engineer forces align under a single office is at the JFC higher headquarters level. As a result, the two providers, operating off of functional priorities, compete for limited theater resources (e.g., funding,

contractors, or Class IV supplies). Joint Base Balad (JBB) and Bagram Airfield (BAF) are two good examples demonstrating the challenges associated with separate BOS-I and SAA Service providers.

Joint Base Balad, Iraq, is the quintessential example of why a failure in unity of command can result in misused resources. JBB was so divided that BOS-I and SAA referred to their areas of responsibility by separate names - Logistics Support Area Anaconda (BOS-I) and Balad Airbase (SAA). Initially, the JFC assigned the Army as BOS-I and the Air Force as SAA. Rather than conducting installation engineer operations as USCENTCOM intended - a joint, coordinated effort for base camp support – the Army and Air Force practiced deconfliction, with each Service staying out of the other’s way.<sup>14</sup> Functionally assigned engineer capability was redundant; commanders fought over land, and engineers constructed duplicate facilities and infrastructure.

Bagram Airfield, Afghanistan was similar to JBB; again, the JFC assigned the Army as BOS-I and the Air Force as SAA. In addition to redundant engineer forces, BOS-I engineers – Air Force engineers under the tactical control of the Army BOS-I provider - were constantly requested by their Service component to assist with SAA issues, specifically favorably interpreting “*The Sand Book*” to influence BOS-I decisions.

As stated, “*The Sand Book*” vaguely establishes BOS-I and SAA roles and responsibilities. For example, SAA is responsible for “the control, operation and maintenance of the airfield to include the runways, associated taxiways, and parking ramps as well as land and facilities whose proximity affects airfield operations.”<sup>15</sup> At BAF, the SAA argued that sustainment services such as dining facilities, billeting, offices, and morale, welfare and recreation facilities necessary for the support of assigned air assets are under the

umbrella of SAA. The SAA loosely tied those functions to essential facilities to conduct air operations. The intent of the guidance is those functions are the responsibility of BOS-I. But the SAA pressured BOS-I engineers to agree with his interpretation.<sup>16</sup> Compounding the problems at JBB and BAF, both BOS-I and SAA use the same contractor for operations and maintenance of facilities and infrastructure. In this situation, the contractor serves two bosses and is constantly struggling to balance resources against multiple priorities.

At both JBB and BAF, failure to follow a basic principle of war - unity of command - prevented the efficient use of engineer assets. The lack of unity of command blurred the lines of authority and command relationships. Assigned to both BOS-I and SAA, engineer forces were redundant. Additionally, both the BOS-I and the SAA providers tasked engineer forces.

JFCs must preserve the principle of unity of command in order to utilize efficiently joint engineer resources. Failure to adhere to unity of command typically results in a lack of a theater common operating picture, the inability to reallocate and assign forces, and battle space owners competing for functional priorities and scarce resources instead of aligning with theater priorities. Furthermore, maintaining unity of command is vital to ensuring unity of effort, the next operational C2 challenge observed during OEF and OIF.

### **UNITY OF EFFORT**

In a 2006 article titled “Logistics – Shaping our Future: A Personal Perspective,” Lt Gen C.V. Christianson, Director for Logistics, J-4, on the Joint Staff, identifies unity of effort as the most critical of all joint logistics outcomes.<sup>17</sup> Furthermore, Lieutenant General Christianson highlights three enablers for achieving unity of effort – capabilities and authorities, shared awareness, and common measures of performance. A lack of JFC focus

during OEF and OIF on these enablers resulted in contingency installation engineering C2 contravening unity of effort, and joint force engineers executing haphazard operations, specifically with respect to synchronizing engineer efforts through theater and base master planning and coordinating theater standards for design and construction.

Joint Publication 1 defines unity of effort as the “coordination and cooperation among all forces toward a commonly recognized objective.”<sup>18</sup> Unity of effort is sometimes mistakenly interchanged with unity of command. In contrast, though, unity of effort focuses on applying resources to achieve an objective rather than C2 authorities. Unity of command and unity of effort are complementary.

Perhaps the greatest roadblock to synchronizing engineer efforts during OEF and OIF was the lack of master planning. Base camp master planning provides commanders a tool for establishing effective power projection and sustainment platforms. According to master planners from CH2M HILL, the primary master planning contractor utilized during OEF and OIF, the purpose of master planning is: (1) to serve as a decision-making tool and improve efficiency; (2) to coordinate and prioritize competing base camp assets; (3) to distribute limited resources in a way that best supports the mission; (4) to provide a validated and synchronized road map for future development; and (5) to propose projects to meet short- and long-range plans.<sup>19</sup>

JFCs failed to recognize the importance of master planning at both the theater and base camp levels. The constantly evolving missions of OEF and OIF required forces to establish a number of base camps based on the current threat or the most challenging region. The theaters lacked a comprehensive theater basing strategy, and commanders acted

reactively rather than proactively, yielding construction planning and programming inefficiencies.

USFOR-A finally recognized the need for a theater basing strategy, developing the Afghan Basing Strategy master plan in order to synchronize engineer efforts with the mission. This strategic level master plan provides generalized guidance for future enduring locations and current base camps. The Afghan Basing Strategy marks the first time the JFC developed a comprehensive, strategic planning guidance for the theater.<sup>20</sup> Unfortunately, it occurred eight years after OEF kicked off. Engineers must be involved at the earliest stages of theater planning and base camp establishment in order to synchronize engineer efforts, avoid poor site selection, and determine how to best leverage local assets.

At the installation level during OEF and OIF, commanders developed base camps by land grabbing rather than base master planning. There was no systematic process such as zoning for base camp development. When forces arrived, they staked claim to a plot of land and developed it like settlers. As base camps matured and the JFC assigned additional forces, construction efforts and base camp expansion forced unit relocations. By not having a master plan at the outset, engineer efforts were not synchronized with long-term theater objectives or mission requirements. Much of the work accomplished needed to be redone and supported units suffered mission degradation as a result of displacement.

USCENTCOM addressed base camp master planning by hiring private contractors. The process involved multiple visits from stateside architect-engineer firms. The contractor delivered the final product six to twelve months later. As a result of the lengthy turnaround time for plan development and lack of embedded assets at the base camp to capture constant changes, contractors did not provide true master plans. Instead, the contractors produced a

snapshot in time. Making matters worse, base camp commanders and assigned tenants did not understand how to use master plans. To overcome this challenge, JFCs must emphasize to battle space owners the value of base camp master planning to the overall support mission. JFCs must also develop a more fluid master planning process in comparison to the current disjointed effort.

Establishing a theater basing strategy and base camp master plans are not the only means in which the JFC can improve unity of effort. OEF and OIF also highlighted issues regarding design and construction standards which are within the JFC's area of control. An OEF Engineer Collection and Analysis Team noted that engineers apply construction standards sporadically across the theater.<sup>21</sup> Design and construction standards are necessary to expedite base camp development, prevent frivolous spending, and maximize resources. A lack of clear standards creates inefficiencies in the use of various resources and time, as well as makes operations and maintenance of base camps more difficult, especially when the organization responsible for operations and maintenance is overseeing multiple base camps.

The JFC is responsible for specifying design and construction standards to optimize the engineer effort.<sup>22</sup> By establishing basic standards, the JFC will normalize construction efforts across the theater thus facilitating improved resource planning, expediting design and construction efforts, and simplifying logistics and maintenance. Additionally, baseline standards reduce design time and errors for common base camp facilities and infrastructure, create site adaptable templates to expedite construction, and avoid repetitive mistakes by adopting the lessons learned.

USCENTCOM uses "*The Sand Book*" as its contingency construction baseline. However, "*The Sand Book*" is not the only guidance available. Joint Publication (JP) 3-34,



*Joint Engineer Operations*, and the Services also provide contingency standards. In addition, educational pipelines train engineers on a variety of design and construction standards such as the Unified Facility Criteria, Life Safety Codes, and Occupational Health and Safety Standards. Unfortunately, not all of these standards are in agreement with the contingency standards. Some standards are more applicable to permanent, garrison based construction than expeditionary construction. When establishing design and construction standards, the JFC must strike a balance between expediency, durability, and safety to meet mission requirements.

The biggest challenge when establishing standards is classifying the base camp (which should occur in the theater basing strategy and base camp master plan previously discussed). Construction standards differ depending on base camp classification. According to *“The Sand Book”*, USCENTCOM classifies base camps as either contingency or permanent.<sup>23</sup> Other common base camp classifications include austere, expeditionary, organic, initial, temporary, semi-permanent, and enduring. The classification dictates the military construction standards outlined in *“The Sand Book”* and JP 3-34. Construction can range from tents and rudimentary electrical distribution to hard facilities and buried utilities.

Once higher headquarters classifies the base camp, JFCs must consider how engineers will operate and maintain the base camp - internally or by contract. This decision will further shape construction standards. In most situations, the JFC utilizes military engineers to establish the base camp and focus on contract construction requirements and executes base camp operations and maintenance by contract. The primary contract mechanism has been the Army’s Logistics Civil Augmentation Program (LOGCAP).

Operations and maintenance must be considered when defining construction standards because contract operations and maintenance typically abide by United States and international construction standards, not expeditionary standards. Throughout OEF and OIF, there were a number of instances when constructed facilities were safe and functional from a life, health and safety standpoint but were built to an austere expeditionary standard that was not accepted by the LOGCAP contractor.<sup>24</sup> If the facilities and infrastructure turned over for contract maintenance does not meet these standards, then the contractor will not assume responsibility. In order to facilitate unity of effort within the base camp and across the theater, the contract should include the approved construction standards. This way the contractor is aware of any difference up front and capable to provide the requisite services without significant cost increases.

As Secretary of Defense Roberts Gates stated, “[W]e can’t afford to spend a single dollar that we don’t have to ... because it takes away from resources to do other things ... it impacts our capabilities.”<sup>25</sup> By maintaining unity of effort through master planning, theater engineering standards, and construction priorities, the JFC focuses engineer assets toward theater priorities, eliminates frivolous spending, and synchronizes operations.

### **COUNTERING SERVICE PAROCHIALISM**

Unity of command and unity of effort are serious operational C2 challenges. However, parochialism causes the Services to believe a problem does not exist with the existing construct thus hindering the JFC’s ability to overcome these C2 issues. The Services argue that they have different standards, expectations, and functional missions. Although the Services continue to adapt to operating in the joint environment, they are hesitant to rely on each other for common support as seen by the base support creep from BOS-I to SAA.

Rather than capitalizing on Service functional expertise, the Services instead are reviewing their ability to provide contingency installation engineering on their own.<sup>26</sup> In other words, can the Army execute the contingency installation engineering mission without the assistance of other Services?

Given the nature of today's wars and the current downsizing of the United States Armed Forces, the Service's self-sustaining mindset is counterproductive to mission success and tears at the seams of unity of command and unity of effort. First, today's wars require synchronized and coordinated application of force by each Service. Typically the forces operate out of a common power projection platform or base camp. With multiple Services operating out of a single base camp, who provides installation engineering support? The Service with the preponderance of assets? Or is the base camp divided into mini-camps? JBB exposed the fallacies with this approach.

Regarding manpower, the Services conducted a force sufficiency analysis on maintaining base camps.<sup>27</sup> The findings identified gross shortfalls in personnel necessary to conduct the installation engineering mission. The Air Force and Navy both reported personnel shortfalls in the thousands. As for the Army, findings indicated the Army no longer possesses the required military capability to conduct the installation engineering mission; the Army focuses on combat engineering. Garrison bases utilize Department of the Army civilians, whereas contingency bases rely on contract solutions for base engineering. The Army is in the process of reconfiguring to develop the capability to oversee contingency base operations for large theater base camps. Finally, the Marine Corps reported minimal installation engineering capability with reliance on the Navy for support.

On their own, the Services do not require sufficient capacity to manage and oversee the contingency installation engineering mission. By leveraging Service expertise, the JFC can integrate Service engineer capabilities across the spectrum of operations to meet the demands of a dynamic environment. Rather than focusing on self-sustainment, the Services should continue to hone the most relevant engineer functions and be ready to contribute to the joint fight.

## **CONCLUSIONS AND RECOMMENDATIONS**

As stated in JP 3-34, “by facilitating the freedom of action necessary to meet mission objectives, engineer capabilities are significant force multipliers for the JFC.”<sup>28</sup> But as this paper demonstrates, failure to maintain C2 of engineer functions, specifically the contingency installation engineering mission, leads to inefficient use of engineering assets. In order to overcome the operational C2 challenges presented with respect to unity of command and unity of effort, the JFC should consider the following four recommendations:

- Appoint an overall theater engineer. A single theater engineer improves unity of command by applying focus, direction, and oversight to joint engineer forces while maintaining a common theater operating picture. The theater engineer should oversee all three engineer functions – combat engineering, general engineering, and geo-spatial engineering – and be able to reassign forces across Services and missions to best support the JFC’s objectives.
- Establish a common-user logistics provider for contingency installation engineering. Assigning an executive agent or lead Service for installation engineering greatly enhances unity of effort. The executive agent or lead Service is responsible for recommending installation engineering force construct, theater policy, basing and

master planning strategy, and design and construction standards to the JFC (or theater engineer). Based on the various Service's engineer function expertise, especially amongst their military members, the Air Force is best suited to serve as the lead Service for contingency installation engineering.<sup>29</sup>

- Establish a single base camp installation engineer entity; align the installation engineer mission under the BOS-I provider (SAA is a supported mission). A single engineer organization per installation facilitates both unity of command and unity of effort. The engineer organization must own the entire installation engineering mission - planning through operations and maintenance. An alternative to this recommendation is to revise BOS-I and SAA definitions by clearly aligning base support responsibilities under BOS-I with SAA as a supported commander.
- Establish master planning templates, standardized designs, and construction standards. Unity of effort is dependent upon higher headquarters direction. Involve engineers early in the planning process to aid in the development of a theater basing strategy and base master planning. Develop standard base layouts, along with site-adaptable designs for common facilities and infrastructure. Site-adaptable designs and construction standards expedite construction timelines and reduce logistics support requirements by establishing a common bench stock for the theater.

## **SUMMARY**

According to a 2010 Engineer Collection Analysis Team tasked to identify engineering lessons learned from OEF, current operations have proven that the joint engineer force has not yet refined the necessary capability sets to plan, program, design, construct, and operate and maintain contingency base camps efficiently.<sup>30</sup> The JFC must address C2 issues

in order to increase responsiveness, flexibility, and theater-wide integration and synchronization of installation engineering efforts. In addition, resolving these issues will ensure the most efficient use of joint force engineers in meeting theater priorities and ultimately supporting the National Military Strategy. If the JFC does not resolve the identified unity of command and unity of effort issues, then the contingency installation engineering mission will continue to be inefficiently executed thus wasting valuable resources, encouraging haphazard operations, and mismanaging power projection platforms. Taking action now will institute more cost-effective and efficient practices at the outset of future contingencies.

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